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# NON-COGNITIVE FACTORS AS PREDICTORS OF INDIVIDUAL SUITABILITY FOR SERVICE IN THE U. S. NAVY

Samuel E. Bowser

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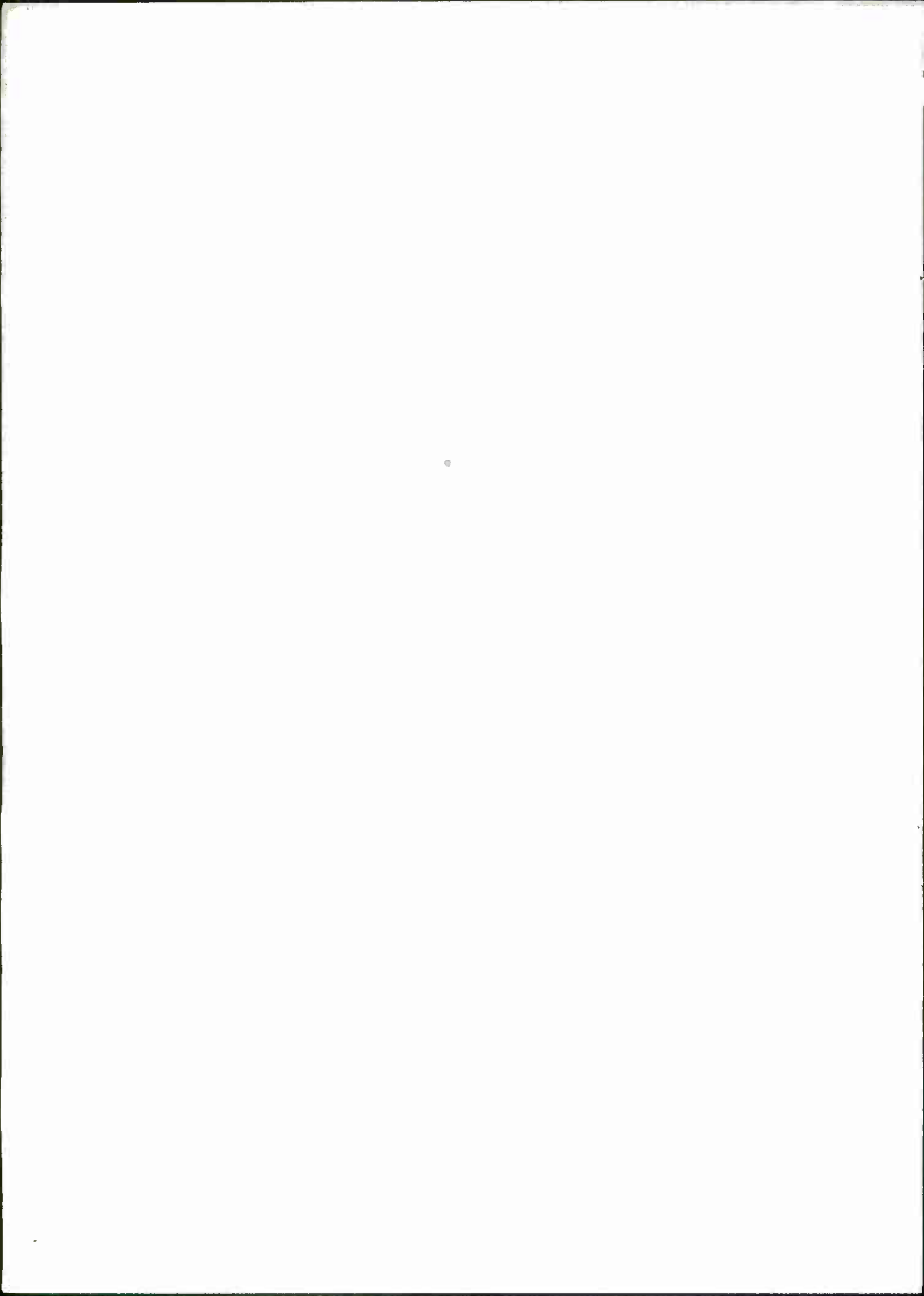
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## SUMMARY

### Background and Problem

The problem of selection and classification of enlisted men in the U. S. Navy was addressed in project 43-07X.A13: Classification Prior to Enlistment, funded during FY 1973. The study reported here addresses the prediction of individual suitability for service in the U. S. Navy using non-cognitive factors. This work was carried to its present state of completion under project 43-07X.04: Improved Man-power Utilization. In order to evaluate potential predictors, a methodology for determining the value of each variable in a particular context is required. There is a multiplicity of variables from which a subset must be selected; it is counter-productive to utilize all of them. An approach was developed which enables a logical selection of subsets of non-cognitive information to optimize the prediction of suitability for service.

### Approach

The analysis, based upon samples of data from 4,000 recruits who entered basic training at San Diego in the Spring of 1968, was accomplished by the use of a Bayesian discrimination technique implemented in the computer program, "CHAROSEL", developed for this project. This program was designed to accomplish the logical selection of a subset of categorical variables as has been presented in this research problem. The data was collected in the form of a questionnaire which provided information concerning 185 potential predictor variables, including biographical, demographic, and opinion items. The criteria utilized were recommendation for reenlistment by the individual's supervisor and actual reenlistment.

### Results

The number of predictor variables was reduced to 51 by use of the "CHAROSEL" program. The original sample reported a correct decision rate of 88.4% compared to a base rate of 50%. Upon cross validation the correct decision rate fell to 65.3%. Cross validation was also done for the criterion of reenlistment with the results of a selection rate of 27.5% compared to a base rate of 8.7%. The results of this pilot study support the contention that non-cognitive data sources are important and useful in prediction of success in the U. S. Navy.

### Recommendations

It is recommended that non-cognitive variables be explored in future research for use in predicting performance and screening personnel. It is further recommended that the Bayesian discrimination technique and program "CHAROSEL" be included among those methodologies employed in research and development concerned with prediction of suitability for Navy service.



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# NON-COGNITIVE FACTORS AS PREDICTORS OF INDIVIDUAL SUITABILITY FOR SERVICE IN THE U. S. NAVY

## INTRODUCTION

Non-cognitive factors, principally of the nominal or categorical type, used in prediction problems for the military have taken many forms, viz., 1) interest responses as in the Strong Vocational Interest Blank or the Navy Vocational Interest Inventory, 2) sociological data, 3) opinion and self-evaluation questionnaires, 4) biodemographical (biographical/demographical) information. It has been difficult, however, to obtain valid measures of the first three forms listed above since they are, at times, influenced by social desirability and, hence, may become unreliable predictors (Nunnally, 1967, p. 479). Biodemographical information, though, can present fewer difficulties in obtaining valid predictors since they are generally answered truthfully. Biodemographical information, therefore, received greater attention in this study than other forms of data in considering the potential of non-cognitive factors as reliable predictors of individual suitability for service in the U. S. Navy. If the potential of the non-cognitive domain can be realized, many positive results can occur; for example, the individuals who are most likely to remain in the Navy could be predicted suggesting additional policies to enhance the reenlistment of these more desirable members.

Attempts to measure the non-cognitive domain have resulted in data of many forms. Non-cognitive data has been shown to be useful in predicting academic achievement (Abe, 1965), vocational goal selection (Fair, 1965), and in identifying creative and other types of scientific talent (Tayler, Ellison, & Tucker, 1965). Prediger (1970) demonstrated that weighted combinations of biographical and academic aptitude did not substantially improve on accuracy of prediction obtained with biographical data alone. Some investigators (Freeberg, 1967; Harding and Bottenberg, 1961) have indicated that a combination of educational achievement and status can serve well or better than aptitude indexes in prediction of technical school success. Still others, e.g., Brokaw (1963), have demonstrated that educational background information collected from a biographical information inventory significantly contributes to the prediction of technical school success. It is clear that the types of information obtained from biographical information blanks and questionnaires have potential value in prediction of performance and selection of personnel.

Concerning the factor structure of the non-cognitive domains Schmuckler (1966) found that while the expressed behavior of groups by age differs, the underlying factors remain the same. He concluded that non-cognitive information has meaningful factor structure across differing ages. Owens and Henry (1966) recommended the biographical information blank and advocated that these instruments be generalized and standardized to make studies comparable. In this regard, the methodology introduced in this report may be used to select standardized sub-sets of biographical information which can be used as predictors.

Several different procedures have been employed in analyzing non-cognitive data. Pickrel (1954) suggested several methods such as multiple regression, unique pattern, and meaningful pattern and recommended pattern analysis rather than multiple regression. Leczner (1951) recommended keying by patterns of response as an effective means of analyzing biographical information. Cory (1970) using regression analysis had moderate non-cognitive information success in discriminating between Category IV personnel and those of other mental levels.

While methodologies for analysis of non-cognitive data have limitations, the data when used in combinations and/or as parts of a successive screening is effective for the purposes of selecting recruits. Dann and Abrahams (1970) found that the use of the Strong Vocational Interest Blank is effective in predicting Naval Academy disenrollment, while others (Abrahams, Lau, Newmann, 1968; Dann and Abrahams, 1969) have failed to demonstrate a predictive relationship between non-cognitive information and criteria. In an attempt to validate a biographical information blank as a predictor of retention of enlisted personnel, Dann and Abrahams (1969) obtained inconclusive results. It is concluded that non-cognitive data as employed in these studies do not provide satisfactory predictors in all cases. However, non-cognitive data encompasses a large area of potential information and as such is difficult to narrow down to the best sub-set of predictors. A U. S. Air Force study (1971) associated with the establishment of an all volunteer force also recommends the exploration of biographical information blanks as a potential source of predictor variables. The Air Force (1967) also made similar recommendations under Project 100,000.

Non-cognitive information has been employed in the Navy in attempts to predict recruit success. Lyons (1965), using a sample from 200,000 youths ages 17 to 26, found that previous individual performance assumes greater significance in predicting initial adjustment to Navy life than does familial or sociological data. The U. S. Navy has utilized as a screening device "Odds for Effectiveness" developed by the Navy Medical Neuropsychiatric Research Unit, San Diego (Plag, 1969). In this device both academic and non-academic predictors were utilized together in predicting individual effectiveness. Effectiveness in this case was defined in terms of whether or not the individual's supervisor recommended the man for reenlistment.

It has been established that non-cognitive factors are potential sources of predictors of recruit suitability in the U. S. Navy. The remaining problems have been to develop a methodology for logically selecting the sub-set of predictors for operational use and to systematically evaluate the effectiveness of the resulting system. The necessary methodology has been developed and is detailed in the method section of this study. In the present study the criteria included both recommendation for reenlistment and actual reenlistment.

## METHOD

Sample: The sample used was originally obtained for studies related to Project 100,000. The overall sample utilized all regular recruits entering basic training at San Diego between 12 February and 4 April 1968. The complete group of men numbered 6,412 recruits, some of which were eliminated because they were in some way special recruits (i.e., recruited for steward rating, etc.). The reduced sample of 6,168 men consisted of 972 (15.78%) in mental category IV and 5,186 (84.21%) in the other mental categories. The supervisors of all these individuals at the end of 18 months service were mailed a questionnaire requesting information concerning the individual's performance and recommendations of the supervisor as to whether or not the man should be asked to reenlist. The return on this mailing was 4,000 or approximately 65% of the reduced sample. This sample of 4,000 is the basic sample from which the smaller samples used in this study were obtained.

Four sets of data were drawn from those records having at least certain elements of the questionnaire data and the criterion (i.e., recommendation re reenlistment). The first two sets, identified as the "50% samples", were formed with each sample having 100 men recommended for reenlistment and 100 men not recommended. This method is similar to the quota sampling procedure (Cockran, 1953, pp 136, 137). The total number of observations in this first pair of samples was 400 or 10% of the data available.

The second two sets of data or "500 samples" were formed by alternately placing observations into one of two samples of 500 men each with no control as to number of individuals in each criterion category. The total number in this set of samples was 1,000 or 25% of the sample population used.

Information as to whether or not the individual actually did reenlist was obtained for those in the second set of samples--"500 samples"--from the enlisted master tapes in March 1973 and encoded into the data records. Three criterion groups were formed, viz., (1) those who did not reenlist; (2) those who did reenlist; (3) those still on their first enlistment. The third group consisted of those who originally enlisted for six years or who had enlistments extended for some special reason such as school. This third criterion alternative was not utilized in the analysis of the data. The two sets of samples--"50% samples" and "500 samples"--are not mutually exclusive.

Procedure: A methodology for defining decision functions based upon Bayes' formula (Wald, 1950) and Bayes' strategy was developed and programmed for this study. The system was proposed in its initial form by Moonan (1972) as "Attribute Bayesian Classification Decision" (ABCD) technique. The ABCD technique was incorporated into CHAROSEL, an algorithm for variable selection and ordering developed by Moonan and Bowser (See Appendix A). CHAROSEL provides results in the form of decision tables based on a posteriori probability of criterion category membership and costs of misclassification errors. The decision tables are then evaluated in terms of the objective function related to a minimization of misclassification and of uncertainty. The "CHAROSEL" program selects

and orders the predictor variables in terms of the "best" decision table, that is, the one with the lowest objective function. The assumptions required for this method are mutual independence of the predictors which, of course, are seldom strictly met. However, the methodology appears to be somewhat robust with regard to this assumption.

The need to cross-validate is evident and was accomplished as follows: the "CHAROSEL" program was applied to one of each pair of samples and the variables which produced the "best" decision table was selected. The selected variables and the endorsement ratios (probability of a given response of predictor variable for each criterion category) from the first sample were then applied to the cross-validation sample to determine the degree to which the percentage of correct decisions would be maintained.

The data to be analyzed were responses to a biographical information questionnaire (See Appendix B) and age and grouped AFQT scores obtained from the individuals' records. The total number of potential predictor variables was 185. The criterion data was obtained from a job performance questionnaire mailed to the supervisors after 18 months of service. Information as to actual reenlistment was also obtained on two samples for criterion use.

## RESULTS

The CHAROSEL program was employed in selecting 51 predictor variables from the pool of 185 for the first of the "50% samples". The cut off for this selection was determined by the point of diminishing returns of predictability versus addition of variables. The resulting decision table (Table 1) reports a correct decision rate of 88.4% compared to the base rate of 50% for this sample. A cross-validation using the second "50% sample" was accomplished. The results of this cross-validation produced a decision table (Table 2) with a correct decision rate of 65.3%. The cross-validation shows a shrinkage of the correct decision of 23.1%, but the cross-validation results remain well above the base rate of 50%.

The 51 selected variables were validated on the first "500 sample" using the "ABCD Technique." The decision table (Table 3) produced has a correct decision rate of 93.4% compared to a base rate of 92.5% in that sample. It is noted that the resulting decision group has a mix of 98% and 2% compared to a base rate of 92% and 8%. The variables as selected were also tested on the second "500 sample" against the alternate criterion of actual reenlistment. The resulting decision table (Table 4) shows a selection rate of 27.5% compared to the sample selection rate of 8.7%.

Appendix C provides the endorsement ratios for the 51 items selected. For item number 11, for example, it can be seen that the smaller the town the recruit comes from the more likely he will be recommended for reenlistment by his supervisor. Another example is a self-evaluation question, item number B44, which is as follows: "People like me don't have much of a chance to be successful in life (A) agree; (B) not sure; (C) disagree".

TABLE 1

## CHAROSEL Decision Table for 51 Variables

## Using Original Balanced Sample

	Decision Groups			
	Not Recommended	Recommended	Total	Percentages
Not Recommended	80	20	100	50.25%
Recommended	3	96	99	49.75%
Total	83	116	199*	
Percentages	41.70%	58.29%		

Objective Function = 1.19616

Percentage Correct Decisions = 88.44%

\*All those observations with more than 40% missing data on the questionnaire were eliminated from the analysis.

## Row Percentages

80.00%	20.00%
3.03%	96.96%

## Column Percentages

96.38%	17.24%
3.61%	82.75%

## Percentages of Total

40.20%	10.05%
1.50%	48.24%

TABLE 2  
CHAROSEL Decision Table for 51 Variables  
Cross Validation

		Decision Groups		
		Not Recommended	Recommended	Total
True Groups	Not Recommended	48	49	97
	Recommended	19	80	99
	Total	67	129	196 *
	Percentages	34.18%	65.81%	

Objective Function = 1.79947

Percentage Correct Decisions = 65.31%

\*All those observations with more than 40% missing data on the questionnaire were eliminated from the analysis.

Row Percentages

49.48%	50.51%
19.19%	80.80%

Column Percentages

71.64%	37.98%
28.35%	62.01%

Percentages of Total

24.48%	25.00%
9.69%	40.81%

TABLE 3

## CHAROSEL Decision Table for 51 Variables

Sample of 500 Validation

Decision Groups				
	Not Recommended	Recommended	Total	Percentages
Not Recommended	26	11	37	7.45%
Recommended	22	437	459	92.54%
Total	48	448	496*	
Percentages	9.67%	90.32%		

Objective Function = 1.33321

Percentage Correct Decisions = 93.35%

All those observations with more than 40% missing data on the questionnaire were eliminated from the analysis.

## Row Percentages

70.27%	29.72%
4.79%	95.20%

## Column Percentages

54.16%	2.45%
45.83%	97.54%

## Percentages of Total

5.24%	2.21%
4.43%	88.10%

TABLE 4

## CHAROSEL Decision Table for 51 Variables

Reenlistment Criteria (500 Sample)

		Decision Groups			
True Groups		Did Not Reenlist	Reenlist	Total	Percentages
	Did Not Reenlist	319	103	422	91.34%
	Reenlist	1	39	40	8.65%
	Total	320	142	462*	
	Percentages	69.26%	30.73%		

Objective Function = 1.20285

Percentage Correct Decisions = 77.49%

\*All those observations with more than 40% missing data on the questionnaire were eliminated from the analysis.

## Row Percentages

75.59%	24.40%
2.50%	97.50%

## Column Percentages

99.68%	72.53%
0.31%	27.46%

## Percentages of Total

69.04%	22.29%
0.21%	8.44%

The individual with the more positive self-evaluation is more likely to be recommended for reenlistment. A further analysis could be pursued by categorizing the types of items into factors either by inspection of the contents of the data as provided in Table 5 or by factor analysis.

The data listed in Table 6 is another way of assessing the value of a variable. The original criterion was obtained from a questionnaire in which there were five possible responses to the question: "Considering his overall performance to date, and the trend of his performance, what would you recommend concerning his reenlistment, if you were called on to recommend him when his current enlistment is up? (Consider only his suitability, not whether he wants to reenlist.) A.) Highly recommended for reenlistment; B.) Recommended; C.) Although marginal, recommended; D.) Not recommended; E.) (Blank)." Bivariate frequency tables, formed for each predictor variable and the 5-level criterion was analyzed by the chi square test for independence. Statistics are reported in Table 6 for those variables for which the relationship with the criterion was significant.

## DISCUSSION

Data analysis has been done to explore the possibility that non-cognitive factors will contribute to prediction and to evaluate a novel methodology. In addition, some characteristics of successful individuals are identified.

The results support the contention that non-cognitive data sources are important and useful in prediction of success in the U. S. Navy. In the process of screening recruits for service the use of non-cognitive predictors can be both useful and instructive. The amount of shrinkage reported in cross-validation was not unreasonable and the fact that the application of the selected variables to "500 sample", which has such a high base rate, still improved the base rate, lends support to the hypothesis of usefulness of this data source. This conclusion is further supported by the application of the selected variables to the reenlistment criteria. The large improvement over base rate prediction is encouraging and needs to be investigated in greater degree. The identification of relevant non-cognitive variables should be a continuing source of new information for the military services. It is further suggested that as stable variables are identified they be used on a continuing basis for purposes such as monitoring changing trends in recruit type and/or character, or developing more accurate prediction models.

The methodology developed for this research offers new means of approaching measurement and prediction problems. The results of this research point the way to expanded use of data sources which were only partially tapped in the past. The new methods indicated here open not only current data sources to more extensive exploration and use, but they also offer possible new data areas to explore. The extension of prediction variables into this non-cognitive area is becoming increasingly important as demands are being made for more non-test oriented screening methods. The approach is non-test oriented and offers valid results. It is recommended that this methodology be included among those methodologies employed in research and development concerned with prediction of suitability for Navy service.

TABLE 5  
STRUCTURE OF ITEMS

Family, Ethnic & Socio-Economic Factors		Authority Problems		Opinion & Self- Evaluation Questions		Employment Exp., Interests and/or Activ.		Academic Interests		Leisure Interests and/or Activ.		Age	
Item No.	Rank	Item No.	Rank	Item No.	Rank	Item No.	Rank	Item No.	Rank	Item No.	Rank	Item No.	Rank
9	4	113	3	B57	9	46	2	81	1	B33	11	AGE	47
11	7	18	6	C6	12	98	5	63	8	B3	18		
25	28	110	17	112	13	B26	10	106	15	118	25		
30	34	114	37	B55	16	50	14	108	19	B10	27		
1&2	40	B23	46	B54	22	B16	20	95	21	B27	32		
7&8	43			B37	24	49	23	75	26	B1	38		
				C4	29	B56	33	107	30	B32	48		
				B46	31	77	35	94	39	B31	49		
				B36	36	99	42	89	45	B6	51		
				B44	41	80	44						
				B47	50								

TABLE 6

Variables with Significant Chi Squares  
with the 5-Level Criteria of Recommendation

Questionnaire Item Number	Rank Order CHAROSEL	Chi Square Value	Sig.
AGE	47	48.05	05
7&8	43	37.25	05
9	4	28.05	05
18	6	36.88	01
25	28	48.28	001
30	34	45.50	001
80	44	34.41	01
94	39	29.72	05
95	21	31.77	001
98	5	67.74	001
99	42	38.29	001
106	15	31.50	01
107	30	35.89	01
108	19	41.04	001
110	17	54.69	001
112	13	49.24	001
113	3	48.76	001
114	37	26.63	01
B1	38	26.20	01
B16	20	32.11	001
B31	49	23.74	05
B37	24	19.54	01
B44	41	36.27	01
B46	31	32.73	01
B54	22	52.55	001
B56	33	27.55	05



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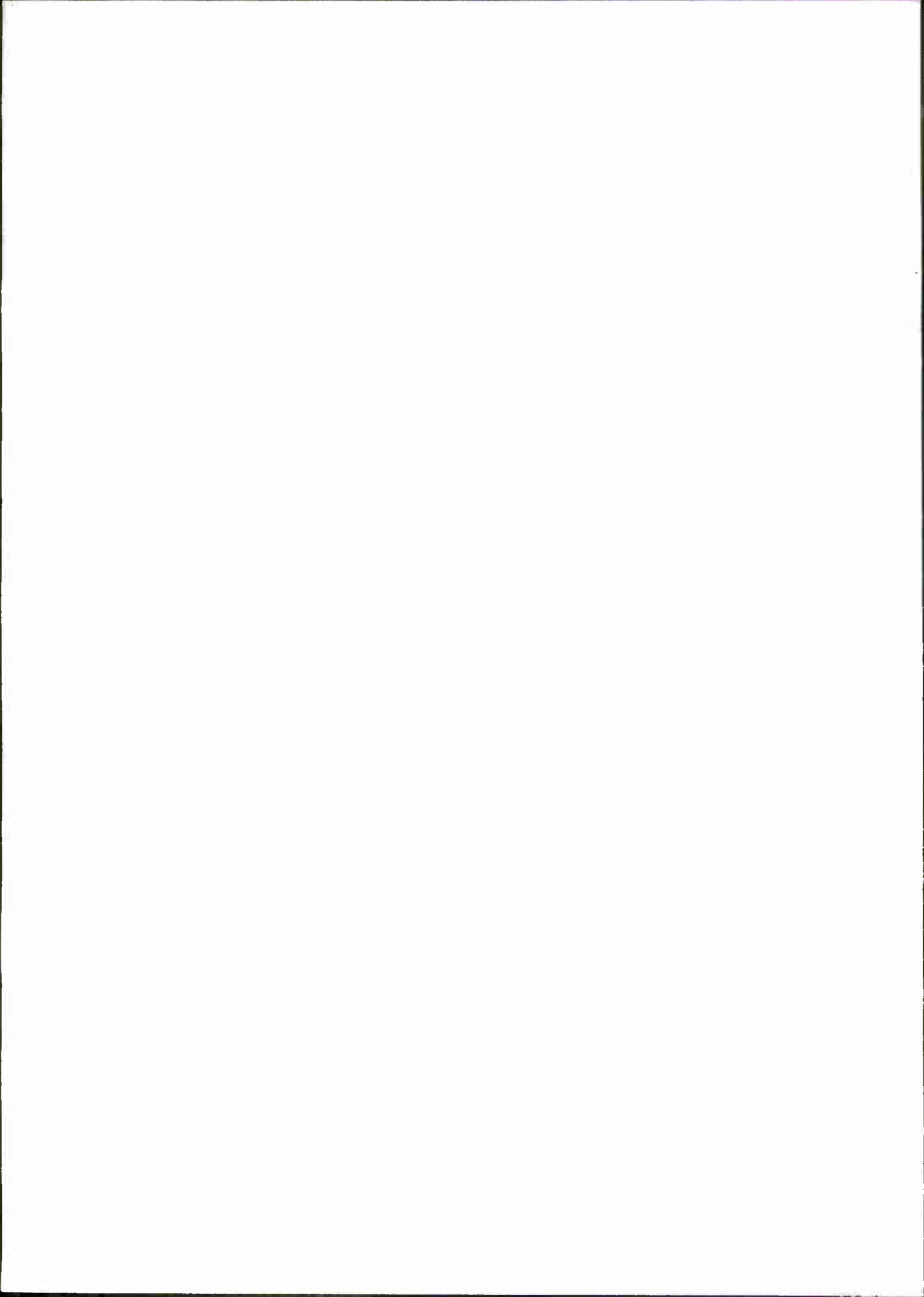
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#### APPENDIX A: CHAROSEL SYNOPSIS

The material in this appendix is a revision of FACT Document No. 27 distributed internally and authored by W. J. Moonan, and S. E. Bowser.



## CHAROSEL SYNOPSIS

### I. INTRODUCTION

The publication of the preliminary documentation in this report provides information about a new technique of selecting categorical predictor variables for categorical criterion prediction problems. The technique is known by the acronym CHAROSEL, meaning "selection of characters." Information provided here should assist research workers in understanding the technique and applying it to their own research work.

The contents of this report will be concerned with the nature of prediction problems, and the desirability of variable or character selection programs. Furthermore, we shall specify the nature of the mathematical approach used by CHAROSEL as well as the input, output features, and applications of the computer program.

### II. BACKGROUND

#### A. Prediction Analysis

We shall be concerned with the subject of prediction analysis which refers to the mathematical-statistical process of making inferences from what we already know (predictor variables or characters) to something which we would like to know (criterion variable or category). The domain of prediction analysis can be characterized by referring to the following table:

TABLE 1

## Types of Prediction Analysis

		DEPENDENT VARIABLE	
		METRICAL CRITERIA	CATEGORICAL CRITERIA
		REGRESSION ANALYSIS Type A	DISCRIMINANT ANALYSIS Type C
INDEPENDENT VARIABLES	METRICAL PREDICTORS		
	CATEGORICAL PREDICTORS	ANALYSIS OF VARIANCE Type B	ABCD ANALYSIS Type D

[After Rozeboom (1966, p. 543)]

Types A, B, and C prediction analysis have well known theoretical and computational bases. These are briefly described by Moonan (1973). Type D predictions appear to be the most difficult since no adequate or practical solution technique has been developed other than that proposed by Moonan (1972). This technique is the basis for prediction analysis within the CHAROSEL program. There exist other types of prediction problems, for example, the case where a metrical criterion is predicted by a combination of categorical and metrical predictors. However, these types will not be considered further in this paper (see Moonan (1974)).

#### B. Variable (Character) Selection Problems

For each type of prediction problem there usually is a requirement because of an abundance of predictors, to utilize some variable or character selection process to reduce the number of variables required to make predictions in operational situations. The following is a brief summary of the prediction analysis types and their associated selection procedure:

TABLE 2

## Types of Variable or Character Selection Analysis

Prediction Type	Prediction Analysis Procedure	Selection Procedure Name
A	Regression	Accretion and Deletion
B	ANOVA	Test of Hypothesis
C	Linear Discriminant Function	Mahalanobis $D^2$
D	ABCD	CHAROSEL

Type D character selection procedures have heretofore not been implemented or have eluded statisticians. This gap is adequately filled by the CHAROSEL technique which selects qualitative predictor characters leading to better predictions.

## III. APPROACH

For any given Type D prediction problem the criterion categories and predictor characters are specified, together with certain parameters required by the program. The population of interest is sampled in order to collectivize a subsample called, for our purposes, a "training sample." The purpose of this sample is to "train" the program by estimating the probabilities of endorsement of each level of a predictor character for every criterion category. The prediction is effected by using a cost of misclassification matrix and the aforementioned posterior probabilities. The "actual prediction" is therefore a decision as to which criterion category the sample member is associated and the decision is determined by indicating that category associated with minimum expected cost of misclassification.

These decisions are assembled into a decision table whose rows represent known categories of membership and whose columns represent the predicted category of membership for the members of the training sample. Ideally the decision table will only contain frequencies in its principle diagonal. Other frequencies are indicative of poor prediction or of misclassification. For each table the program computes an objective function whose value equals 1.00000 if no prediction errors are made, otherwise the objective function is larger than unity.

The character selection feature is invoked by CHAROSEL by computing decision tables and attendant objective functions for each predictor character available. That character with minimum objective function is the first character selected. In the second stage CHAROSEL combines the first selected

character together with each other available predictor and selects the pair which produces a decision table with minimum objective function. That predictor chosen in combination with the first selected character is then designated as the second selected character. This process is repeated sequentially until all available predictor characters are exhausted or until the program terminates because of data processing constraints.

#### IV. OBJECTIVE FUNCTION

The objective function used in CHAROSEL is as follows:

$$- \frac{\sum_{i=1}^k P_i \sum_{\substack{j=1 \\ i \neq j}}^k p_{ij} \log_2(p_{ij}) + \sum_{i=1}^k \frac{n_{ii}}{f_{ii}}}{k} \quad (1)$$

$$\text{Minimum Limit } f_{ii} = 1 \quad (2)$$

$P_i$  = a priori probability

$p_{ij}$  = cell proportion off principal diagonal

$n_{ii}$  = number of occurrences in a given group

$f_{ii}$  = diagonal cell frequency

$k$  = number of groups

The first part of the numerator has the effect of minimizing the uncertainty in the decision matrix. The second term maximizes the principal diagonal or, in other terms, maximizes correct decisions. The denominator normalizes the function to produce a limit of one in cases of perfect prediction.

#### V. USER OPTIONS

The user of CHAROSEL has considerable freedom with regard to type of procedure he wishes to utilize with this program. Among these options are:

1. The endorsement ratios may be either supplied by the user or the program will calculate them from the training sample.
2. A limit may be given for the maximum number of variables with missing data that are allowed for each object of the training sample and/or missing data may be used as a "level" in the corresponding predictor variable.

3. Certain predictor variables may be forced to be utilized initially in the CHAROSEL predictor variable identification at the option of the user.

4. If the user wishes to utilize the cross validation process this may be accomplished by taking the variables selected by CHAROSEL and running them on the ABCD program with a testing sample.

5. Training sample data may be either on cards or on tape, however there exists an input form to be completed by the user before execution.

## VI. PROGRAM RESTRICTIONS

1. The training sample size must be less than or equal to 500.

2. The number of criterion categories must be less than or equal to 10.

3. The number of levels for each predictor character must be less than or equal to 10.

4. The number of predictors is limited by computer system core size and is related to sample size. Adjustment may be made to larger numbers of predictors but at present the program is set for 200 predictor variables maximum.

5. At present the program is operational only on an IBM 360/65 computer system and utilizes a core size of 300K bytes.

6. Prospective DOD users may arrange for access to the computer program by contacting

Director, Computer Services Department  
Navy Personnel Research and Development Center  
San Diego, California 92152

7. Other potential users should contact the authors.



APPENDIX B

U. S. NAVY BIOGRAPHICAL INFORMATION FORM



APPENDIX B

U. S. NAVY BIOGRAPHICAL INFORMATION FORM

DIRECTIONS

The purpose of this questionnaire is to find out about your background and about things that you have done in the past and plan to do in the future. It has questions about the kinds of courses you have taken in school, jobs you have had, groups you have been a member of, and the like.

For each question choose the best answer from those given and blacken the circle for that letter on your answer sheet. DO NOT MAKE ANY MARKS ON THIS BOOKLET. You should answer all of the questions.

Begin with Section "A" of your answer sheet. You will need to use all of Sections "A" and "B", and a few items from Section "C".

NOTE:

- Indicates items which were selected by "CHAROSEL" program.

START ON THE BACK OF THIS PAGE

What kind of work does (or did) your father or guardian do? Use his most recent job. Mark only one of the 10 possible answers for items 1 and 2.

1. A. Unskilled work  
B. Semi-skilled work - truck driver, farm or ranch hand  
C. Skilled work - carpenter, mechanic, machinist, etc.  
D. Supervisor or foreman  
E. Sales work
2. A. Technical - bookkeeper, draftsman, computer programmer, etc.  
B. Manager of office, business farm or ranch  
C. Owns own business, ranch or farm  
D. Professional - lawyer, doctor, teacher, electrical engineer, etc.  
E. I don't know or not applicable

What kind of work do you want to be doing in 10 years? Mark only one of the 9 possible answers for items 3 and 4.

3. A. Unskilled work  
B. Semi-skilled work - truck driver, farm or ranch hand, etc.  
C. Skilled work - carpenter, mechanic, machinist, etc.  
D. Supervisor or foreman  
E. Sales work
4. A. Technical - bookkeeper, draftsman, computer programmer, etc.  
B. Manager of office, business, farm or ranch  
C. Own own business, ranch or farm  
D. Professional - lawyer, doctor, teacher, electrical engineer, etc.

How far in school did your father go? Mark only one of the 10 possible answers for items 5 and 6.

5. A. None, or some grade school  
B. Completed grade school  
C. Some high school, but did not graduate  
D. Graduated from high school  
E. Technical, business or trade school after high school
6. A. One year or less of college  
B. More than one year of college but did not graduate  
C. Graduated from a 4-year college  
D. Attended graduate or professional school  
E. I don't know

How far in school did your mother go? Mark only one of the 10 possible answers for items 7 and 8.

7. A. No school, or some grade school  
B. Completed grade school  
C. Some high school, but did not graduate  
D. Graduated from high school  
E. Technical, nursing, or business school after high school
8. A. One year or less of college  
B. More than one year of college but did not graduate  
C. Graduated from a 4-year college  
D. Attended graduate or professional school  
E. I don't know

9. Which of the following best describes you?
  - A. Negro
  - B. White
  - C. American Indian
  - D. Oriental
  - E. Other
10. Which best describes your family background?
  - A. Puerto Rican
  - B. Mexican American
  - C. Guamanian, Virginia Islander, or American Samoan
  - D. Filipino
  - E. None of the above
11. Where have you lived during most of your life?
  - A. Large city, 500,000 or over
  - B. City, 50,000 to 500,000
  - C. City, 10,000 to 50,000
  - D. Small town, 1000 to 10,000
  - E. Town of 1000 or less or a farm or ranch
12. In what area of town did your family live for the longest time while you were growing up?
  - A. One of the best areas
  - B. A good but not the best area of town
  - C. An average area
  - D. One of the poorer areas
  - E. Lived on a farm or ranch
13. Did your parents live together most of the time while you were going to school?
  - A. Yes
  - B. No, because one or both died
  - C. No, because they separated
  - D. No, they were divorced
  - E. No, for other reasons
14. During the past ten years, how many full-time jobs has your father had?
  - A. Question does not apply or I don't know.
  - B. None
  - C. 1 or 2
  - D. 3 or 4
  - E. 5 or more
15. While you were a teen-ager, what was the main source of your family income?
  - A. Father's full-time work
  - B. Mother's full-time work
  - C. Father's part-time work
  - D. Mother's part-time work
  - E. Other
16. When you were in school, how much money did your family have in comparison with your classmates' families?
  - A. Less than most
  - B. About the same
  - C. A little more
  - D. Considerably more
  - E. I don't know
17. Looking back on the days you spent in your family or childhood home, how happy were they?
  - A. Very happy
  - B. Fairly happy most of the time
  - C. Neither very happy nor very unhappy
  - D. Fairly unhappy most of the time
  - E. Very unhappy

TURN TO THE BACK OF THIS PAGE

18. As a teen-ager, how often did you have quarrels with your parents?
- A. Never
  - B. Seldom
  - C. Occasionally, but not often
  - D. Often
  - E. Not applicable
19. How much freedom did your parents allow you as a teen-ager?
- A. Almost none
  - B. Very little
  - C. About average
  - D. Quite a bit
  - E. A lot
20. How unhappy were you about leaving home for the first time?
- A. Very unhappy
  - B. Somewhat unhappy
  - C. Somewhat happy
  - D. Very happy
  - E. Not applicable
21. How many children were there in your family?
- A. I was the only one
  - B. One other child
  - C. 2-3 other children
  - D. 4-6 other children
  - E. More than 6 other children
22. How do the ages of the other children in your family compare with yours?
- A. I am an only child
  - B. I am the oldest
  - C. I am the youngest
  - D. There are children both younger and older
23. How many of your brothers or sisters are old enough to go to college?
- A. I don't have any brothers or sisters
  - B. None
  - C. One
  - D. 2 or 3
  - E. More than 3
24. How many of your brothers or sisters have gone to college?
- A. I don't have any brothers or sisters
  - B. None
  - C. One
  - D. 2 or 3
  - E. More than 3
- \*25. How many of your brothers and sisters quit before finishing high school?
- A. I don't have any brothers or sisters
  - B. None
  - C. One
  - D. 2 or 3
  - E. More than 3
26. Of the jobs you have had, how long did you work at the job you held the longest?
- A. I haven't had a job
  - B. Less than 1 month
  - C. 2 or 3 months
  - D. 4-6 months
  - E. Longer than 6 months

GO TO THE NEXT PAGE

27. What kind of worker were you on the jobs you have had?
- A. I worked hard at any kind of job I had
  - B. I worked hard only at those jobs that interested me
  - C. Sometimes I worked hard and sometimes I didn't, even when there was work to do
  - D. I have never worked hard at any of the jobs I have had
  - E. Other, or I haven't had a job
28. How satisfied were your bosses with your work?
- A. They told me I was doing a good job
  - B. They seemed to be satisfied with my work
  - C. Some bosses liked my work but others didn't
  - D. They weren't satisfied with my work
  - E. Other, or I haven't had a job
29. Have you ever been fired from a job?
- A. No, and I have never come close to being fired
  - B. No, but I have come close to being fired
  - C. Yes, once
  - D. Yes, 2 or 3 times
  - E. Yes, more than 3 times
30. If you were to be discharged now, how much money do you think you could earn per week?
- A. \$50 per week or less
  - B. \$50-\$75 per week
  - C. \$75-\$100 per week
  - D. \$100-\$150 per week
  - E. \$150 per week or more
31. How much do you expect to be earning per week in 10 years?
- A. \$100 per week or less
  - B. \$100-\$150 per week
  - C. \$150-\$200 per week
  - D. \$200-\$250 per week
  - E. \$250 per week or more
32. How much would you like to be earning per week in 10 years?
- A. \$100 per week or less
  - B. \$100-\$150 per week
  - C. \$150-\$200 per week
  - D. \$200-\$250 per week
  - E. \$250 per week or more
33. What share of your own support did you earn in your last year of school?
- A. None--all my expenses were paid for me
  - B. Only extra spending money
  - C. All spending money
  - D. All spending money and some room and board
  - E. All expenses
34. How much responsibility do you want in a job?
- A. A lot
  - B. Some, but I still want to have someone over me
  - C. Only a small amount
  - D. None
  - E. I don't know

TURN TO THE BACK OF THIS PAGE

Which of the following jobs have you had and how did you like it?  
For each job listed choose the most correct answer from the five given  
on the right, and mark the circle for that letter on your answer sheet.

35. gas station attendant

36. paper route

37. sales clerk in a store

38. door-to-door salesman

39. grocery sacker, carryout  
boy or shelf stocker

40. lawn mowing and trimming

41. farm or ranch hand

42. busboy, waiter or  
kitchen helper

43. worker in a car wash

44. mechanic or mechanic's helper

45. heavy equipment operator  
(such as a bulldozer or  
dragline)

46. construction or factory worker

47. camp counselor

48. truck driver

49. janitor and maintenance

50. warehouseman

51. stock clerk

52. machine operator (such as  
a punch press)

53. TV or radio repairman

54. other skilled labor

55. other unskilled labor

A. Yes, I had this job and I  
liked it a lot

B. Yes, I had this job and I  
liked it somewhat

C. Yes, I had this job but I  
didn't like it

D. No, I have not had this job  
but I would liked to have  
had it

E. No, I have not had this job  
and I would not have wanted it

GO TO THE NEXT PAGE

56. What are your plans for the future?
- A. Reenlist in the Navy
  - B. Go back to the job I had before entering the Navy
  - C. Get a new job
  - D. Get more school training
57. What statement best describes how you feel about the time you will spend in the Navy?
- A. A chance for a career, if I like it
  - B. A chance to get training for a job I can do when I get out
  - C. A chance to see the world or have new experiences
  - D. A way to avoid being drafted
  - E. A waste of 4 years of my life
58. How many times did you change schools before you were 18 years old--other than by graduation?
- A. Never
  - B. 1 or 2 times
  - C. 3 or 4 times
  - D. 5 or 6 times
  - E. More than 6 times
59. How did your grades rank in the class in your last year of high school? (Make your best guess if you don't know.)
- A. Upper 25%
  - B. 26-50%
  - C. 51-75%
  - D. Lower 25%
  - E. I didn't go to high school
60. How would you have ranked in the class if you had done the very best you could?
- A. Upper 25%
  - B. 51-75%
  - C. 25-50%
  - D. Lower 25%
  - E. I didn't go to high school
61. How good a student did your parents or guardians expect you to be in school?
- A. One of the best students in my class
  - B. Above the middle of the class
  - C. In the middle of my class
  - D. Just good enough to get by
  - E. I don't know
62. How much education did your parents or guardians want you to have?
- A. Didn't care if I finished high school
  - B. Finish high school only
  - C. Some education beyond high school
  - D. At least a college degree
  - E. I don't know
63. How much did you like school?
- A. I really liked it
  - B. It was all right
  - C. I didn't much care one way or the other
  - D. I didn't like it
  - E. I hated it

TURN TO THE BACK OF THIS PAGE

64. How do you think your teachers generally thought of you in school?
- A. As a student who got by without having to work hard
  - B. As a hard worker in all courses
  - C. As a hard worker in some courses but not in others
  - D. As a student not willing to work hard in any courses
  - E. Other, or I don't know
65. When did you consider most seriously quitting school and going to work?
- A. I never considered quitting
  - B. During grade school
  - C. During the early years in high school
  - D. Near or on graduation from high school
  - E. While in college
66. Why did you leave school?
- A. I graduated
  - B. I had to work full time
  - C. I was expelled or suspended
  - D. I was tired of school
  - E. Other, or two of the above
67. How many times were you sent to the office for disciplinary reasons during your last 2 years in school?
- A. None
  - B. Once
  - C. 2 or 3 times
  - D. 4 or 5 times
  - E. More than 5 times
68. What was your grade average for all your high school work?
- A. A-, A, or A+
  - B. B-, B, or B+
  - C. C-, C, or C+
  - D. D-, D, or D+
  - E. I didn't go to high school

GO TO THE NEXT PAGE

Which of the following courses did you take in school and how much did you like them? For each course choose the best answer from the five given on the right, and mark the circle for that letter on your answer sheet.

- |                              |   |
|------------------------------|---|
| 69. General Mathematics      |   |
| 70. English                  |   |
| 71. Foreign Language         |   |
| 72. General Science          |   |
| 73. History                  |   |
| 74. Agriculture              | A. Yes, I took this course and I liked it a lot             |
| 75. Physical Education (Gym) | B. Yes, I took this course and I liked it somewhat          |
| 76. Bookkeeping              |   |
| 77. Typing                   | C. Yes, I took this course and I did not like it            |
| 78. Work Shop                | D. No, I did not take this course but I would have liked to |
| 79. Electrical Shop          | E. No, I did not take this course and I did not want to     |
| 80. Auto Shop                |   |
| 81. Biology                  |   |
| 82. Chemistry                |   |
| 83. Physics                  |   |
| 84. Algebra                  |   |
| 85. Trigonometry             |   |
| 86. Calculus                 |   |
| 87. Social Studies           |   |
| 88. Speech                   |   |

TURN TO THE BACK OF THIS PAGE

What grade did you get in each of the following subjects the last time you took a course in it? For each course choose the best answer from the five given on the right, and mark that letter on your answer sheet. Leave your answer sheet blank for those courses you did not take.

●89. General Mathematics

90. English

91. Foreign Language

92. General Science

93. History

●94. Agriculture

●95. Physical Education (Gym)

96. Bookkeeping

A. A-, A, or A+

97. Typing

B. B-, B, or B+

●98. Wood Shop

C. C-, C, or C+

●99. Electrical Shop

D. D-, D, or D+

100. Auto Shop

E. E or F

101. Biology

102. Chemistry

103. Physics

104. Algebra

105. Trigonometry

●106. Calculus

●107. Social Studies

●108. Speech

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109. What age did you start dating?

- A. I have not dated
- B. 12 or younger
- C. 13-14
- D. 15-16
- E. 17 or older

110. How many traffic tickets have you gotten, other than parking tickets?

- A. None-I don't drive
- B. None
- C. One
- D. 2 or 3
- E. 4 or more

111. Have you ever held a position of leadership, such as an officer of your class, president of a school club or church group, or captain of an athletic team?

- A. No, and I have never wanted one
- B. No, but I would have liked one
- C. Yes, once
- D. Yes, several times
- E. Yes, many times

112. In the past, how have you reacted to competition?

- A. I have done my best
- B. I haven't been bothered by it
- C. I have done all right, but I haven't liked it
- D. I have done poorly
- E. Other, or I don't know

113. Have you ever been in trouble with the police, other than for traffic tickets?

- A. No
- B. Nothing more than warnings
- C. Yes, once
- D. Yes, 2 or 3 times
- E. Yes, more than 3 times

114. Have any of your friends ever been in trouble with the police?

- A. No
- B. Yes, but only minor trouble or warnings
- C. Yes, one friend has been in trouble
- D. Yes, 2 or 3 friends have been in trouble
- E. Yes, more than 3 have been in trouble

115. How many books (other than school books) have you read in the last 3 months?

- A. None
- B. One
- C. 2 or 3
- D. 4 or 5
- E. More than 5

TURN TO THE BACK OF THIS PAGE

Which of the following groups have you been active in? For each group listed choose the best answer from the five given on the right, and mark the circle for that letter on your answer sheet.

116. member of the student council  
at school

117. member of a school athletic  
team

118. member of an athletic team  
other than at school

119. worker on a school paper or  
yearbook

120. actor in a play or show

TURN YOUR ANSWER SHEET  
OVER TO SECTION "B"

A. Yes, I was very active in this

B. Yes, I was fairly active in this

C. Yes, I was somewhat active  
in this

D. No, I was not active in this  
but I would have liked to

E. No, I was not active in this  
and I did not want to

B1. member of a debating team

B2. member of a "hot rod" or  
car club

B3. member of the Boy Scouts,  
Sea Scouts or Explorers

B4. member of a church youth group

B5. member of a school band,  
orchestra or singing group

B6. member of a band or singing  
group other than school

B7. member of Future Farmers of  
America, 4H, or other  
agricultural group

B8. member of a hobby club, such  
as photography or skin-diving

B9. member of some other group  
not listed above

GO TO THE NEXT PAGE

Which of these things have you done? For each activity choose the best answer from the five given on the right, and mark the circle for that letter on your answer sheet.

- |  |  |
|--|--|
| <input type="radio"/> B10. dated girls   |  |
| B11. drank beer or liquor  |  |
| B12. played cards for money  |  |
| B13. took out a girl by picking her up   |  |
| B14. repaired a household appliance  |  |
| B15. repaired plumbing in a house  |  |
| <input type="radio"/> B16. tuned a car or replaced parts, such as a water pump | A. Yes, I did this a number of times (5 or more) |
| B17. fired a shotgun or rifle for hunting                                      | B. Yes, I did this several (2-4) times           |
| B18. collected stamps, coins or other objects                                  | C. Yes, I did this once                          |
| B19. drove a truck   | D. No, I never did this and I never wanted to    |
| B20. smoked  |  |
| B21. shot dice for money   |  |
| B22. went to dances  |  |
| <input type="radio"/> B23. stayed out all night without permission             |  |
| B24. used an adding machine  |  |
| B25. operated power tools  |  |
| <input type="radio"/> B26. used a typewriter                                   |  |
| <input type="radio"/> B27. played a musical instrument                         |  |
| B28. built things, such as boats, furniture or model airplanes                 |  |
| B29. helped build a house or other buildings                                   |  |
| B30. written a poem or short story   |  |
| <input type="radio"/> B31. painted a picture                                   |  |
| <input type="radio"/> B32. used a camera                                       |  |
| <input type="radio"/> B33. tried drugs, such as marijauna LSD, or pep pills    |  |
| B34. rode a motorcycle   |  |

TURN TO THE BACK OF THIS PAGE

On each of the following items, fill in circle A if you agree; fill in circle B if you are not sure; and fill in circle C if you disagree.

B35. People who accept their condition in life are happier than those who try to change things

- A. agree
- B. not sure
- C. disagree

B36. Good luck is more important than hard work for success

- A. agree
- B. not sure
- C. disagree

B37. Every time I try to get ahead, something or somebody stops me

- A. agree
- B. not sure
- C. disagree

B38. If a person is not successful in life, it is his own fault

- A. agree
- B. not sure
- C. disagree

B39. For most things, I would rather not do them than take a chance of failing

- A. agree
- B. not sure
- C. disagree

B40. I would make any sacrifice to get ahead in the world

- A. agree
- B. not sure
- C. disagree

B41. If I could change, I would be someone different from myself

- A. agree
- B. not sure
- C. disagree

B42. I sometimes feel that I just can't learn

- A. agree
- B. not sure
- C. disagree

B43. I would do better in school work if teachers didn't go so fast

- A. agree
- B. not sure
- C. disagree

B44. People like me don't have much of a chance to be successful in life

- A. agree
- B. not sure
- C. disagree

B45. The tougher the job, the harder I work

- A. agree
- B. not sure
- C. disagree

B46. I am able to do many things well

- A. agree
- B. not sure
- C. disagree

GO TO THE NEXT PAGE

How do you compare with other men of your own age on the following things? For each, choose the best answer from the five given on the right, and mark the circle for that letter on your answer sheet.

- B47. understanding what you read
- B48. speed of reading
- B49. getting out of things you don't want to do
- B50. winning arguments
- B51. repairing mechanical things
- B52. repairing electrical things
- B53. doing hard physical work
- B54. doing work that takes a lot of thinking
- B55. looking neat and clean
- B56. repairing a car
- B57. getting along smoothly with adults
- B58. doing school work
- B59. leading other people
- B60. organizing other people
- C1. meeting people and making new friends
- C2. working hard and doing a good job
- C3. getting along smoothly with your parents
- C4. making decisions
- C5. being successful in the things you want to do
- C6. feeling satisfied with yourself
- C7. getting people to like you

- A. Quite a bit above average
- B. Somewhat above average
- C. Average
- D. Somewhat below average
- E. Quite a bit below average

STOP



APPENDIX C

ENDORSEMENT RATIOS FOR SELECTED 51 VARIABLES



## Endorsement Ratios for Selected 51 Variables

Item <sup>1</sup>	Response									Criterion <sup>2</sup> Category	Rank	
	0	1	2	3	4	5	6	7	8	9		
*Age	0 0	0 0	0 0	5.1% 2.1%	34.7% 16.7%	43.9% 45.8%	10.2% 24.0%	3.1% 5.2%	1.0% 2.1%	2.0% 4.2%	1 2	47
*1&2	15.3% 12.5%	6.1% 1.0%	8.2% 7.3%	22.5% 21.9%	18.4% 17.7%	6.1% 11.5%	1.0% 3.1%	7.1% 4.2%	8.2% 10.4%	7.1% 10.4%	1 2	40
7&8	13.3% 10.4%	4.1% 2.1%	3.1% 7.3%	14.3% 19.8%	40.8% 37.5%	11.2% 7.3%	4.1% 1.0%	1.0% 7.3%	4.1% 5.2%	4.1% 2.1%	1 2	43
9	1.0% 0	6.1% 7.3%	85.7% 90.6%	1.0% 2.1%	2.0% 0	4.1% 0					1 2	4
* 11	0 0	33.7% 5.2%	16.3% 20.8%	31.6% 33.3%	13.3% 26.0%	5.1% 14.6%					1 2	7
* 18	1.0% 1.0%	4.1% 11.5%	29.6% 36.5%	41.8% 45.8%	23.5% 5.2%	0 0					1 2	6
25	6.1% 9.4%	0 0	69.4% 71.9%	11.2% 12.5%	11.2% 6.3%	2.0% 0					1 2	28
30	0 0	2.0% 1.0%	16.3% 11.5%	32.7% 42.7%	40.8% 32.3%	8.2% 12.5%					1 2	34
46	3.1% 3.1%	9.2% 11.5%	13.3% 34.4%	6.1% 12.5%	25.5% 3.1%	42.9% 35.4%					1 2	2
49	3.1% 4.2%	3.1% 3.1%	8.2% 7.3%	9.2% 6.3%	7.1% 0	69.4% 79.2%					1 2	23

\* Variables of special interest because of explanatory value.

<sup>1</sup> See Appendix B for identification of items.

<sup>2</sup> Criterion Category 1 consists of those subjects not recommended for reenlistment, 2, those who were so recommended

Item1	Response									Criterion <sup>2</sup> Category	Rank
	0	1	2	3	4	5	6	7	8	9	
50	3.1% 3.1%	9.2% 3.1%	4.1% 11.5%	0 1.0%	20.4% 19.8%	63.3% 61.5%				1 2	14
* 63	0 0	19.4% 30.2%	60.2% 56.3%	14.3% 10.4%	4.1% 2.1%	2.0% 1.0%				1 2	8
75	0 0	66.3% 64.6%	25.5% 20.8%	5.1% 7.3%	2.0% 4.2%	1.0% 3.1%				1 2	26
77	1.0% 1.0%	19.4% 26.0%	34.7% 35.4%	18.4% 7.3%	14.3% 22.9%	12.2% 7.3%				1 2	35
80	0 1.0%	29.6% 12.5%	6.1% 2.1%	0 1.0%	49.0% 56.3%	15.3% 27.1%				1 2	44
* 81	0 0	26.5% 40.6%	32.7% 45.8%	17.4% 6.3%	9.2% 6.3%	14.3% 1.0%				1 2	1
* 89	9.2% 14.6%	11.2% 18.8%	30.6% 37.5%	41.8% 25.0%	5.1% 4.2%	2.0% 0				1 2	45
94	62.2% 69.8%	8.2% 7.3%	11.2% 10.4%	6.1% 9.4%	7.1% 2.1%	5.1% 1.0%				1 2	39
95	4.1% 5.2%	48.0% 56.3%	30.6% 21.9%	14.3% 12.5%	2.0% 1.0%	1.0% 3.1%				1 2	21
* 98	23.5% 56.3%	13.3% 10.4%	30.6% 27.1%	21.4% 4.2%	8.2% 1.0%	3.1% 1.0%				1 2	5
99	67.4% 80.2%	4.1% 5.2%	5.1% 7.3%	11.2% 4.2%	8.2% 0	4.1% 3.1%				1 2	42
106	85.7% 79.2%	1.0% 1.0%	0 4.2%	5.1% 4.2%	3.1% 6.3%	5.1% 5.2%				1 2	15

Item <sup>1</sup>	Response									Criterion Category <sup>2</sup>	Rank
	0	1	2	3	4	5	6	7	8	9	
107	12.2% 7.3%	4.1% 8.3%	24.5% 37.5%	45.9% 39.6%	13.3% 6.3%	0 1.0%				1 2	30
108	55.1% 55.2%	1.0% 4.2%	11.2% 20.8%	20.4% 10.4%	8.2% 5.2%	4.1% 4.2%				1 2	19
*110	0 1.0%	5.1% 2.1%	26.5% 45.8%	20.4% 22.9%	29.6% 24.0%	18.4% 4.2%				1 2	17
112	1.0% 0	77.6% 78.1%	9.2% 12.5%	6.1% 7.3%	2.0% 2.1%	4.1% 0				1 2	13
*113	0 0	57.1% 74.0%	14.3% 16.7%	20.4% 8.3%	8.2% 0	0 1.0%				1 2	3
*114	0 0	28.6% 40.6%	37.8% 36.5%	14.3% 12.5%	12.2% 2.1%	7.1% 8.3%				1 2	37
118	0 0	27.6% 36.5%	10.2% 12.5%	9.2% 7.3%	30.6% 29.2%	22.5% 14.6%				1 2	25
B 1	1.0% 2.1%	2.0% 4.2%	10.2% 6.3%	5.1% 13.5%	38.8% 43.8%	42.9% 30.2%				1 2	38
*B 3	0 1.0%	29.6% 29.2%	20.4% 15.6%	14.3% 15.6%	11.2% 29.2%	24.5% 9.4%				1 2	18
B 6	0 2.1%	23.5% 24.0%	4.1% 3.1%	4.1% 4.2%	26.5% 30.2%	41.8% 36.5%				1 2	51
B10	0 0	90.8% 94.8%	6.1% 2.1%	2.0% 3.1%	1.0% 0					1 2	27
B16	1.0% 1.0%	53.1% 44.8%	22.5% 16.7%	10.2% 17.7%	12.2% 15.6%	1.0% 4.2%				1 2	20

Item <sup>1</sup>	Response									Criterion <sup>2</sup> Category	Rank
	0	1	2	3	4	5	6	7	8	9	
*B23	1.0% 0	18.4% 14.6%	24.5% 15.6%	22.5% 24.0%	25.5% 38.5%	8.2% 7.3%				1 2	46
B26	0 1.0%	73.5% 66.7%	9.2% 24.0%	7.1% 2.1%	6.1% 6.3%	4.1% 0				1 2	10
B27	2.0% 1.0%	40.8% 40.6%	7.1% 8.3%	19.4% 18.8%	22.5% 27.1%	8.2% 4.2%				1 2	32
B31	4.1% 0	27.6% 25.0%	12.2% 22.9%	24.5% 25.0%	26.5% 22.9%	5.1% 4.2%				1 2	49
B32	1.0% 0	80.6% 69.8%	12.2% 22.9%	6.1% 4.2%	0 1.0%	0 2.1%				1 2	48
B33	4.1% 0	1.0% 3.1%	0 2.1%	1.0% 1.0%	74.5% 69.8%	19.4% 24.0%				1 2	11
*B36	4.1% 2.1%	7.1% 3.1%	6.1% 5.2%	82.7% 88.5%						1 2	36
B37	3.1% 3.1%	14.3% 15.6%	25.5% 29.2%	57.1% 51.0%						1 2	24
*B44	7.1% 3.1%	7.1% 4.2%	14.3% 12.5%	71.4% 79.2%	1.0%					1 2	41
B46	7.1% 3.1%	70.4% 68.8%	19.4% 24.0%	3.1% 3.1%	1.0%					1 2	31
B47	8.2% 5.2%	17.4% 19.8%	28.6% 30.2%	36.7% 39.6%	9.2% 4.1%	0 1.0%				1 2	50
*B54	10.2% 8.3%	7.1% 10.4%	29.6% 37.5%	41.8% 40.6%	10.2% 3.1%	1.0% 0				1 2	22

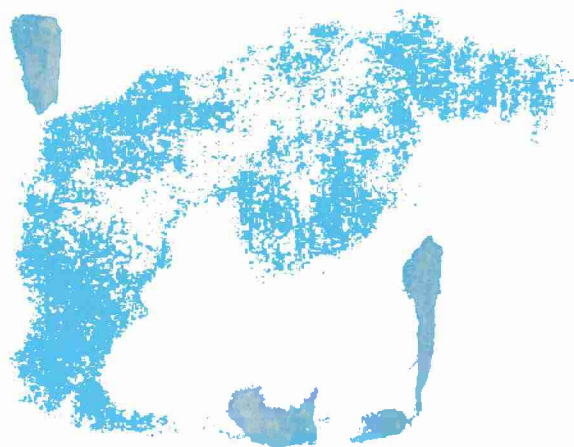
Item <sup>1</sup>	Response										Criterion <sup>2</sup> Category	Rank
	0	1	2	3	4	5	6	7	8	9		
B55	12.2% 8.3%	22.5% 17.7%	36.7% 51.0%	26.5% 21.9%	2.0% 0	0 1.0%					1 2	16
B56	12.2% 8.3%	18.4% 17.7%	20.4% 17.7%	26.5% 28.1%	17.4% 17.7%	5.1% 10.4%					1 2	33
B57	12.2% 8.3%	29.6% 29.2%	28.6% 41.7%	23.5% 19.8%	5.1% 0	1.0% 1.0%					1 2	9
C 4	16.3% 14.6%	7.1% 8.3%	34.7% 43.8%	37.8% 32.3%	4.1% 1.0%	0 0					1 2	29
C 6	17.4% 16.7%	12.2% 6.3%	22.5% 22.9%	37.8% 38.5%	9.2% 12.5%	1.0% 3.1%					1 2	12



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